COMPUTER HARDWARE

(ORIENTATION)

COURSE CONTENTS - 9TH CLASS
THEORY

Text	Scope
Chapter No. 1	
1. Geometrical & Technical Drawing (05 periods)	
1.1 Introduction of drawing	• Know the meaning, importance and uses of technical drawing
1.2 Drawing Instruments	• Familiarize with the drawing instruments, their construction, uses and cares.
1.3 Basic and alphabet of lines	• Introduce the types of basic lines • Familiarize with the types of alphabet of lines with their weight, shape and proper construction
1.4 Geometrical construction	• Know angles, triangles, quadrilateral, polygons and circle elements
1.5 Free Hand sketching	• Introduce the importance of sketching • Describe the procedure of sketching for shapes, geometric figures and models
1.6 Multi view Drawing	• Introduce the concepts of orthographic drawing. • Describe the procedures to draw the Front, Side and Top Views
1.7 Pictorial Drawing	• Describe the procedure to draw the Isometric and Oblique drawing of simple shapes and models.
1.8 Symbols	• Introduce various electrical and electronic symbols
Chapter No. 2	
2. Electrical Essentials of Electronic (04 periods)	
2.1 Electrical terminology & their symbols	• Explain the basic electrical terminology their symbols and units. • Define alternating and direct current
2.2 Types of matter	• Define conductor, Insulator and semiconductor
2.3 Ohm's law	• Ohm's law and its applications
2.4 Energy & Power	• Define energy and power

Text	Scope
2.5 Circuits	• Define the open, close and short circuits • Identify series and parallel circuit and explain their characteristics

Chapter No. 3

3. Electronics Passive Components (04 periods)	
3.1 Resistor	• Describe the purpose of resister and its units
3.2 Colour coding	• Identify resistance by colour code or labeling.
3.3 Capacitor	• Describe the purpose of capacitor, its types and units
3.4 Inductor	• Describe the purpose of inductor, and its units
3.5 Transformer	• Describe the purpose of transformer and its types

Chapter No. 4

4. Electronics Active Components (03 periods)	
4.1 Semiconductor	• Explain semiconductor • Describe P- type and N type materials.
4.2 Diod	• Explain working of diod.
4.3 Transistors	• Describe transistor (PNP and NPN)
4.4 Amplifier	• Explain transistor as an amplifier.

Chapter No. 5

5. Explain the Concepts of Digital and Analog System (03 periods)	
5.1 Number Systems	• List types of number systems • Explain the conversion of decimal to binary system and vice versa. • Explain decimal to octal and hexadecimal system and vice versa.
5.2 Bit & bytes	• Define bit and byte.
5.3 Logic gates	• Define and list the logic Gates. • Explain AND, NAND, OR, NOR, XOR, gates. • Explain the truth tables of logic gates.

Chapter No. 6

6 Basics of Computer (03 periods)	
6.1 Introduction	• Introduce Personal computer
6.2 Types of computer	• Explain types of computer
6.3 Part of computer	• Explain various parts of computer

Text	Scope
6.4 Working procedure of computer	• Explain the working procedure of computer
Chapter No. 7	
7. Care of Computer (03 periods)	
7.1 Introduction	• Explain what is care of computer
7.2 Back-up	• Explain the method of taking of back-up
7.3 Damages to the hardware	• Describe damages to the hardware
7.4 Accidental deletion	• Explain what is accidental deletion and how to avoid it
7.5 Care of hard disk	• Explain the care and arrangement of hard disk
7.6 Virus	• What is virus and explain kinds of viruses
Chapter No. 8	
8. Boot-up Procedure (01 period)	
8.1 Power on self-test.	• Describe power on self test
8.2 Bootable diskette	• Explain the boot up process
8.3 Plug and play	• Explain plug and play
Chapter No. 9	
9. Input and Output Devices (04 periods)	
9.1 Input devices	• Define input and output devices of computer system. • List input devices.
9.1.1 Keyboard	• State the purpose of keyboard.
9.1.2 Mouse	• State the purpose of mouse
9.1.3 Mic	• State the purpose of mic
9.1.4 Scanner	• State the purpose of scanner.
9.1.5 Digital Camera	• State the purpose of digital camera.
9.2 Output devices	• List output devices
9.2.1 Monitor	• State the purpose of Monitor.
9.2.2 Printer	• State the purpose of printer • List and explain the types of printer
9.2.3 Speakers	• State the purpose of speakers.

COMPUTER HARDWARE (ORIENTATION)

LIST OF PRACTICALS -9TH CLASS

1. Draw basic lines and alphabet of drawing lines.
2. Draw different types of angles, triangles, quadrilateral and polygons.
3. Draw elements of circle.
4. Sketch geometric shapes and models.
5. Draw Front, Side and Top views of simple wooden model.
6. Draw simple Isometric and Oblique Drawings of simple models.
7. Draw the different symbols relating to concerned field.
8. Identify the Electronics Component and Color Code.
9. Connection of the Resister in series and parallel
10. Connection of the capacitor in series and parallel
11. Connection of the indictor in series and parallel
12. Use of Hand tools
13. Use of Digital meter
14. Use of Analog meter
15. Measuring the primary and secondary voltage of Transformers.
16. Testing of Diode with ohm meter.
17. Half Wave Rectifire
18. Full Wave Rectifire
19. Bridge Rectifire
20. Regulated Power Supply
21. Use of I.C
22. Checking of NPN and PNP transistor with meter.
23. Logic gates
24. AND gate
25. NAND gate
26. OR gate
27. NOR gate
28. Inverter
29. Exclusive OR gate
30. Exclusive NOR gate
31. Meassurement of the Switch Mod Supply Voltage
32. Power supply Installation in CPU.
33. Checking of Monitor Controls
34. Checking of CRT
35. Keyboard function.
36. Mouse function.
37. Scanner function.
38. Display of RAM
39. Configure The Mother Board Slots
40. Display of Computer Parts
41. Dot matrix printer installation with driver
42. Inkjet printer installation with driver.
43. Laser jet printer installation with driver.

COMPUTER HARDWARE (ORIENTATION)
LIST OF TOOLS, INSTRUMENTS, EQUIPMENT AND CONSUMABLES

1.	**Hand Tools**	6 Nos. each
	1.1 Screw driver set	
	1.2 Player set	
	1.3 Soldering iron with stand	
	1.4 Soldering wire	
	1.5 Sucker for desoldering	
2.	**Test Instruments**	6 Nos. each
	2.1 C.R.O 40 MHz (only one in lab)	
	2.2 Multimeter (analog and digital)	
	2.3 Logic probs.	
	2.4 Contact cleaner	
	2.5 Varo board/bread board	
	2.6 Variable power supply (0-12 volt)	
	2.7 D .T .01	
3.	**Electronic Components.**	20 Nos. each
	3.1 Resistors (various values , types and wattage)	
	3.2 Capacitors(various values , types and voltage)	
	3.3 Transistors (NpN and PnP)	
	3.4 LED Different color	
	3.5 Regulator IC (3,5,9,12 volts)	
	3.6 Diode/Bridge (various amp)	
	3.7 Transformer (6-volt,12-volt)	
	3.8 Gate Ics (74LS00, 74LS02, 74LS04)	
	3.9 Flip Flop Ics(74LS74)	
	3.10 Character Display	
4.	**PC Card of various Types.**	02 Nos. each
	4.1 TV Tunner Card	
	4.2 Fax Modem Card	
	4.3 Sound Card	
	4.4 Net Work Card	
	4.5 3D SVGA Card	
5.	**Mother Board of various types.**	02 Nos. each
	5.1 Branded Mother Board	
	5.2 Unbranded Mother Board	
6.	**Hard Disk, Floppy Disk Drive, CD-Drive.**	06 Nos. each
7.	**Printers.**	02 Nos. each
	7.1 Inkjet	
	7.2 Laser	
8.	**PERSONAL Computer**	02 Nos. each
	8.1 P-IV Intal original (complete multimedia)	
	8.2 P-III Intal original (complete multimedia)	

COMPUTER HARDWARE

REFERENCE BOOKS FOR TEACHERS

1. Digital Electronics: by Malik Ghulam Haider
2. Computer Repair & Maintenance: by Intel Corporation, Dr. G. M. Dabid
3. A+ Certification: published by John by John

GENERAL RECOMMENDATIONS

Text Book

1. The textbook should be fully illustrated based on approved national curriculum.
2. The language used should be Urdu/English. Script should be simple and easy. Examples should be chosen from every day life wherever possible.
3. There should be uniformity in terminology in textbooks. For this purpose a glossary of uniform terminology based upon S.I. Units should be prepared and provided.
4. The Technical Terms/Terminology should not be translated as such and these should be directly written in Urdu.
5. Objective type as well as descriptive test items should be provided at the end of each chapter, which should serve as guideline for students and teachers.
6. The experiments suggested in the curriculum should be dealt with in detail in a separate Practicals' Manual. The experiments should be prescribed in an open-ended manner.
7. Since curriculum development is a continuous process, a follow-up committee should be formed to check its proper implementation and evaluation.

Practical Manual

In order to maintain a uniform standard of practical activities throughout the country, Practical Manual should be prepared for the purpose. This manual should cover all the practicals in the trade indicating Title of practical, material, Tools & Instruments, Procedure, figure(s), Readings/ output data/result/conclusions and safety precautions etc. The final practical examination should be based on the activities prescribed in the curriculum.

Teacher's Guide

In order to provide direction in the planning of academic activities, the Trade teacher needs some resource material to bank upon. A teacher's guide giving essential background information, knowledge, lesson schemes, objectives, teaching methodologies, motivation, conducting practical, assessment procedures etc. be prepared for the purpose and provided to the Trade teachers.

Workshop

1. In order to facilitate the students to develop desired skills and competencies, it is recommended that practical activities should be carried out individually, where possible.
2. The workshop should be fully equipped as stipulated in the Curriculum. Provision should be made in school budget to purchase/replace latest tools and equipments to update the workshop.
3. Recommended consumables should be provided for practicals in reasonable quantity.

Evaluation of Curriculum

It is recommended that provincial curriculum evaluation committees should be formulated on permanent basis comprising curriculum experts, teacher trainers, working technical teachers, experts, subject specialists and educationists to evaluate the shortcomings and achievements of the curriculum. The committees will be expected to remain in contact with the teachers to obtain feedback for decision making.

Methodology of Instruction

Following methods of teaching may be used in technical education as considered appropriate by the teacher:

1. Project Method
2. Illustration Method
3. Investigation Method
4. Demonstration Method
5. Practice/Drill Method
6. Lecture Method
7. Assignment Method
8. Discussion (Questions & Answers) Method
9. Visit to industry
10. Tutorial

Characteristics of Technical Teachers

For effective instruction, the desirable qualities of competent technical teachers should be:-

a) Good manager, facilitator, and counsellor
b) Educational background and industrial experience
c) Mastery of instructional techniques
d) Competence in the subject
e) Resourcefulness and creativeness
f) Ability to develop good personal relationship with students
g) Knowledge of performance evaluation procedures

Promotional Activities

During education various co-curricula activities develop and promote interest, positive attitudes and commitment. Following activities may be utilized to promote Vocational and Technical Education:

1. Technical club
2. Bulletin Board
3. Exhibition corner
4. Display of Projects
5. Quiz Contests

6. Technical & Science exhibition
7. Technical & Science Fair
8. Technical & Science Olympiad etc.

Assessment of Student Achievement

The procedure in vogue for evaluation is the examination. It is however, suggested that in addition to annual examination, the teachers should also evaluate class work on completion of each lesson/unit followed by periodic tests in the subject. Besides periodic and annual tests, skill standards prepared by National Training Bureau should be used at the end of the year.

For the purpose of classroom appraisal, individual as well as group technique may be used. The tests should comprise both short answer and objective type questions. Assessment should focus knowledge, skills, competencies, and application of concepts and ability to use the techniques and tools. It is therefore, suggested that a comprehensive scheme of knowledge, skills, competencies etc. be prepared to assess students' achievements. Rigorous efforts are needed to prepare such items. Standardized test items, be prepared for the use of the examining Boards and also for the classroom teachers.

It is to be kept in mind that students study habits are influenced by the teacher's method of testing. It is therefore, suggest that examination should be a meaningful activity.

Recommended Scheme of Studies

Each vocational subject is being divided into two parts – theory and practical, of 50 marks each. Geometrical and Technical Drawing is included as an essential part of the engineering trades. Questions of 20 % marks will be from Geometrical and Technical Drawing and the rest of the examination will be of 80% marks covering the whole theory and practical course of the respective trade.

Relative Marks distribution in Examination is as under:

Theory Paper: 50	(i)	Trade	40 Marks
	(ii)	Geometrical & Technical Drawing	10 Marks
Practical Paper: 50	(i)	Trade	40 Marks
	(ii)	Geometrical & Technical Drawing	10 Marks
Total: 100			

In the examination, the level of learning abilities to be tested may be taken as:

Knowledge – The ability to recall facts, nomenclature, classifications, practical techniques, laws and theories, straight-forward calculation and computation.

Comprehension – The ability to translate data from one form to another (verbal into mathematical, tabular or graphical and vice versa) to interpret or deduct the significance of data, and to solve problems.

Application – The ability to apply knowledge, experience and skill to new situations presented in a novel manner.

In the theory examination paper such questions may be set which facilitate to test learning abilities related to *Knowledge, Comprehension* and *Application*..

The questions asked may provide the students an opportunity to give reasoned arguments, to apply his knowledge to the theoretical and practical problems, or to interpret given data and apply in the situation described thereby.

In the practical examination, the student will be required to perform a practical, to use tools and equipment, to observe and tabulate data, perform calculations and draw graphs, to locate fault, to make physically required circuits, to troubleshoot and repair desired circuit/unit etc.

In the practical examination, the level of competencies and skill to be tested may be taken into five categories as:

Imitation - The ability to observe skill and attempt to repeat it.

Manipulation - The ability to perform skill according to instruction rather than observation.

Precision - The ability to reproduce a skill with accuracy, proportion, and exactness.

Articulation- The ability to combine more than one skill in sequence with harmony and consistency.

Naturalisation – The ability to comprehend one or more skills with ease and adapt automatically with limited physical or mental exertion.

Use of Tools - The skills and competencies to use tools and equipment.

Approximate percentage of marks allotted to each of the above abilities may be:-

Knowledge..... *20 %*
Comprehension..... *25 %*
Application..... *15 %*
Skills and competencies..... *40 %*